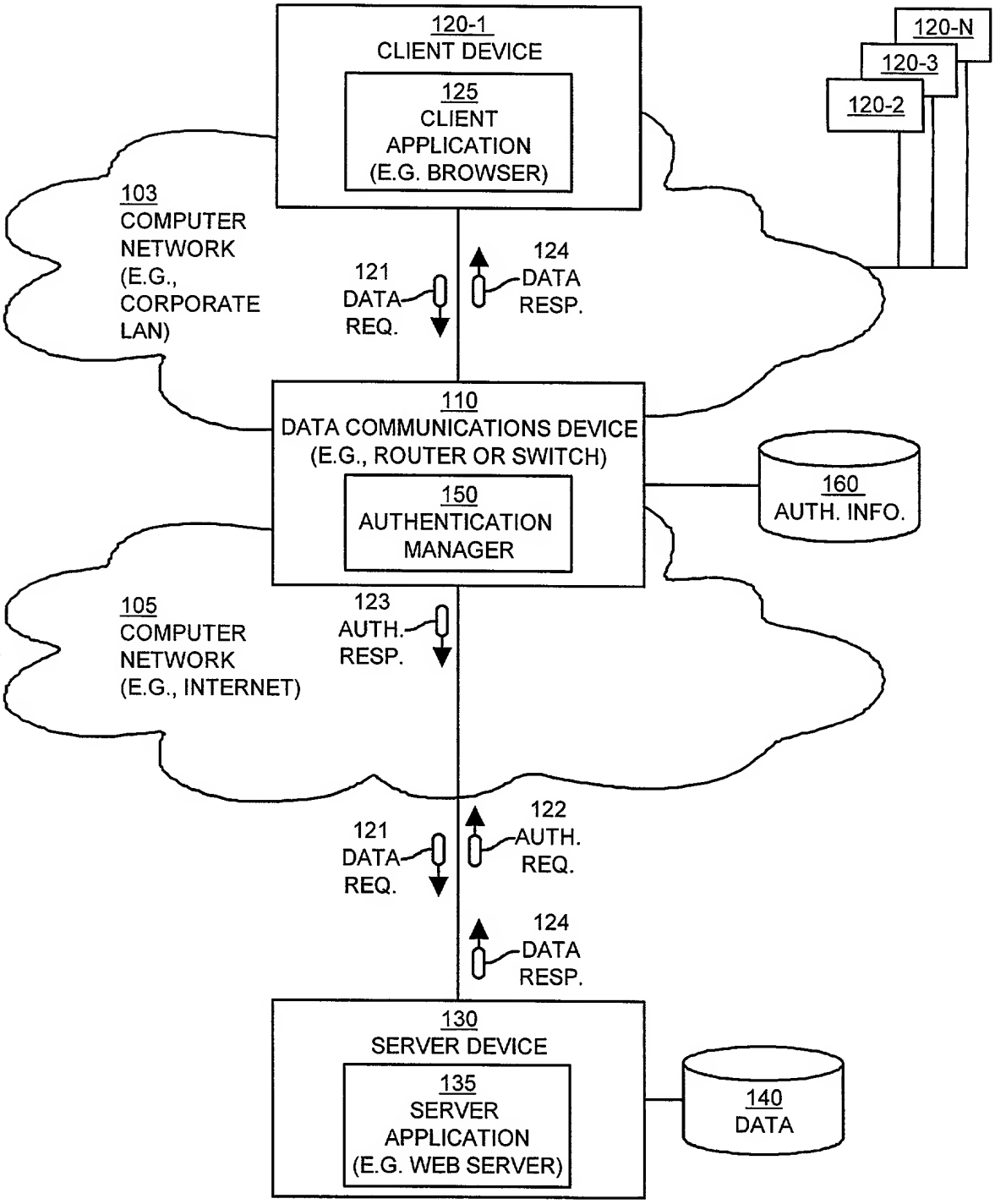
120-1
CLIENT DEVICE
125
CLIENT
APPLICATION
(E.G. BROWSER)
120-N
120-3
120-2
103
COMPUTER
NETWORK
(E.G.,
CORPORATE
LAN)
121
DATA
REQ.
124
DATA
RESP.
110
DATA COMMUNICATIONS DEVICE
(E.G., ROUTER OR SWITCH)
150
AUTHENTICATION
MANAGER
160
AUTH. INFO.
105
COMPUTER
NETWORK
(E.G., INTERNET)
123
AUTH.
RESP.
121
DATA
REQ.
122
AUTH.
REQ.
124
DATA
RESP.
130
SERVER DEVICE
135
SERVER
APPLICATION
(E.G. WEB SERVER)
140
DATA

FIG. 1

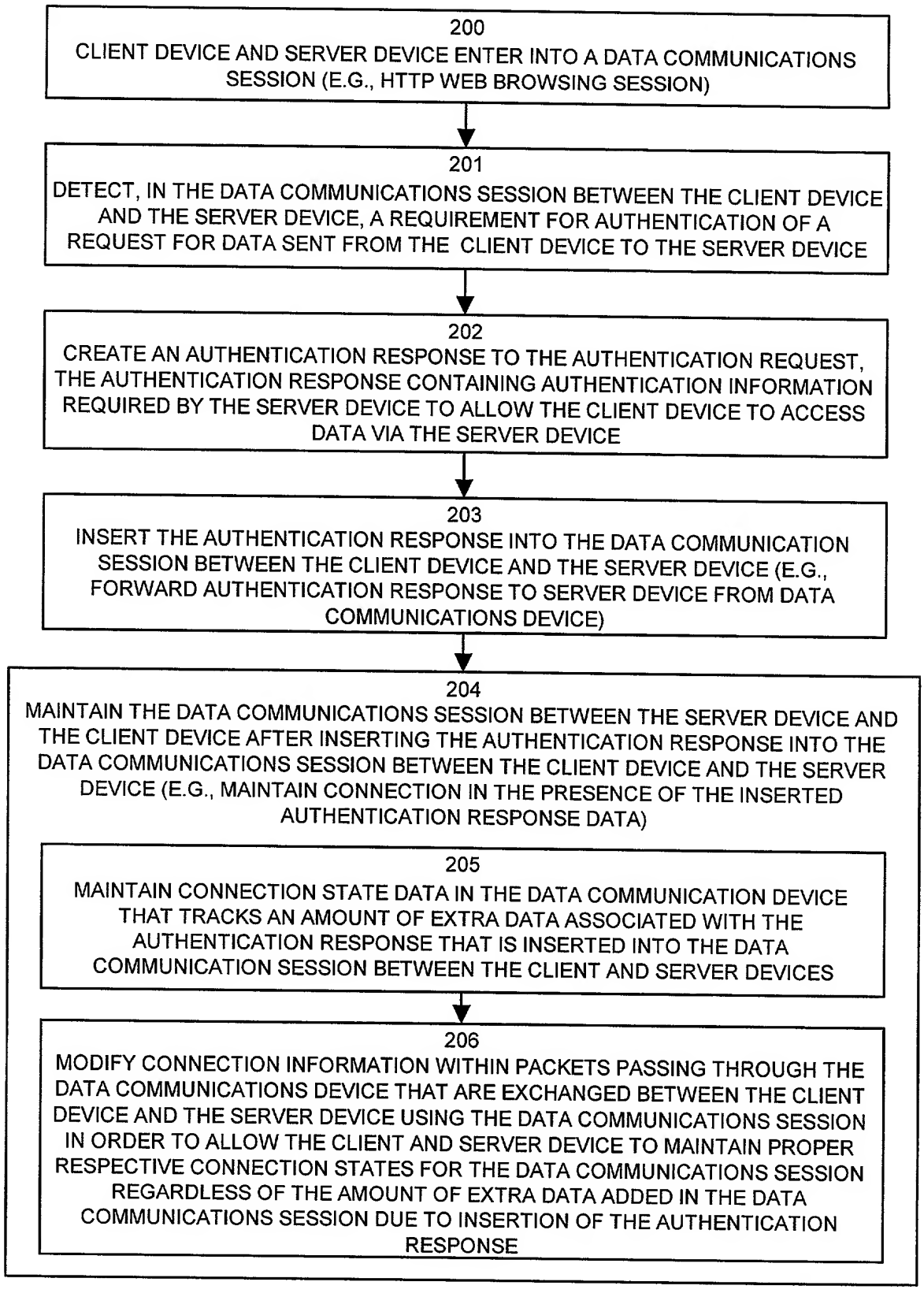
200
CLIENT DEVICE AND SERVER DEVICE ENTER INTO A DATA COMMUNICATIONS SESSION (E.G., HTTP WEB BROWSING SESSION)
201
DETECT, IN THE DATA COMMUNICATIONS SESSION BETWEEN THE CLIENT DEVICE AND THE SERVER DEVICE, A REQUIREMENT FOR AUTHENTICATION OF A REQUEST FOR DATA SENT FROM THE CLIENT DEVICE TO THE SERVER DEVICE
202
CREATE AN AUTHENTICATION RESPONSE TO THE AUTHENTICATION REQUEST, THE AUTHENTICATION RESPONSE CONTAINING AUTHENTICATION INFORMATION REQUIRED BY THE SERVER DEVICE TO ALLOW THE CLIENT DEVICE TO ACCESS DATA VIA THE SERVER DEVICE
203
INSERT THE AUTHENTICATION RESPONSE INTO THE DATA COMMUNICATION SESSION BETWEEN THE CLIENT DEVICE AND THE SERVER DEVICE (E.G., FORWARD AUTHENTICATION RESPONSE TO SERVER DEVICE FROM DATA COMMUNICATIONS DEVICE)
204
MAINTAIN THE DATA COMMUNICATIONS SESSION BETWEEN THE SERVER DEVICE AND THE CLIENT DEVICE AFTER INSERTING THE AUTHENTICATION RESPONSE INTO THE DATA COMMUNICATIONS SESSION BETWEEN THE CLIENT DEVICE AND THE SERVER DEVICE (E.G., MAINTAIN CONNECTION IN THE PRESENCE OF THE INSERTED AUTHENTICATION RESPONSE DATA)
205
MAINTAIN CONNECTION STATE DATA IN THE DATA COMMUNICATION DEVICE THAT TRACKS AN AMOUNT OF EXTRA DATA ASSOCIATED WITH THE AUTHENTICATION RESPONSE THAT IS INSERTED INTO THE DATA COMMUNICATION SESSION BETWEEN THE CLIENT AND SERVER DEVICES
206
MODIFY CONNECTION INFORMATION WITHIN PACKETS PASSING THROUGH THE DATA COMMUNICATIONS DEVICE THAT ARE EXCHANGED BETWEEN THE CLIENT DEVICE AND THE SERVER DEVICE USING THE DATA COMMUNICATIONS SESSION IN ORDER TO ALLOW THE CLIENT AND SERVER DEVICE TO MAINTAIN PROPER RESPECTIVE CONNECTION STATES FOR THE DATA COMMUNICATIONS SESSION REGARDLESS OF THE AMOUNT OF EXTRA DATA ADDED IN THE DATA COMMUNICATIONS SESSION DUE TO INSERTION OF THE AUTHENTICATION RESPONSE

FIG. 2

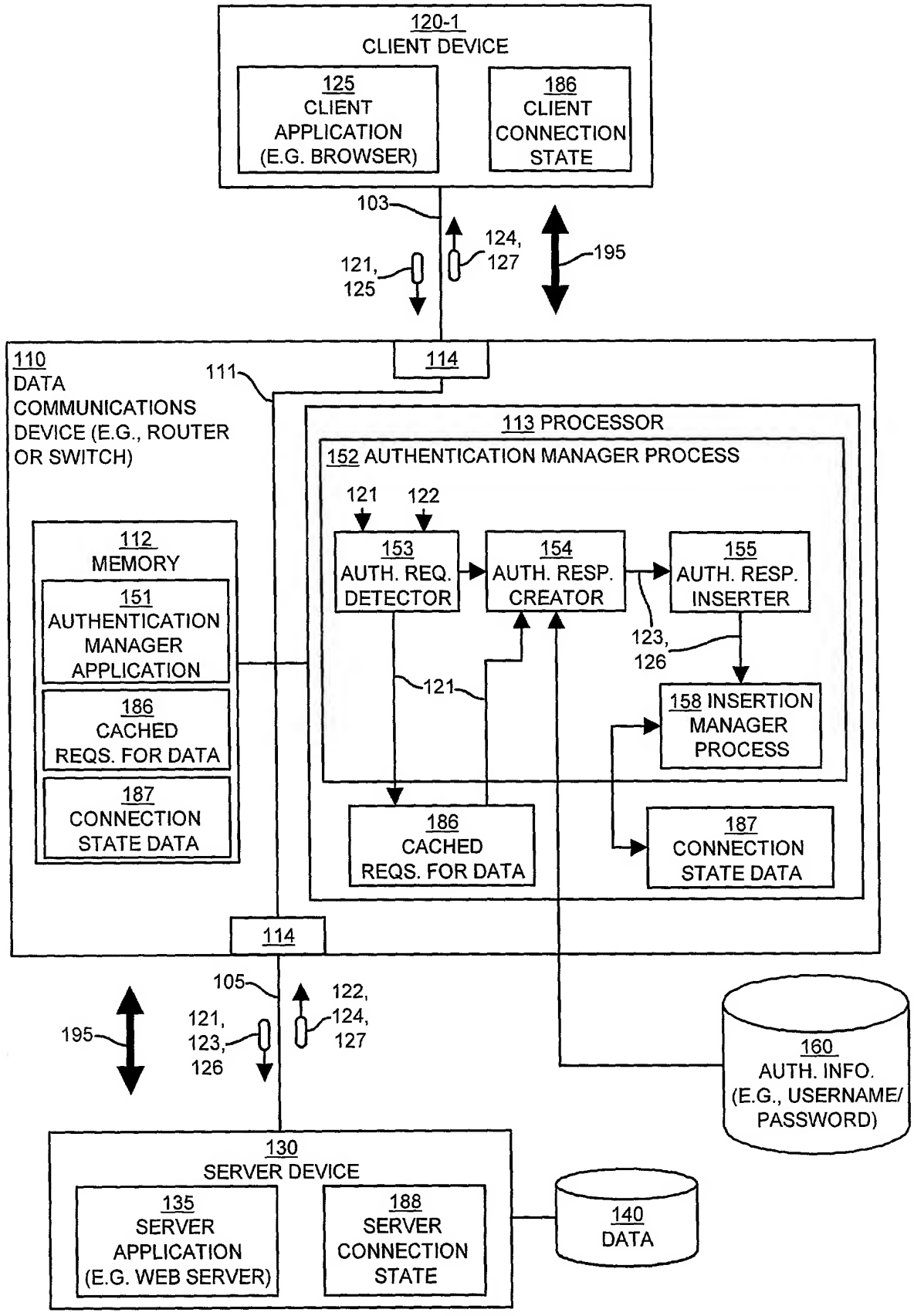
120-1
CLIENT DEVICE
125
CLIENT
APPLICATION
(E.G. BROWSER)
186
CLIENT
CONNECTION
STATE
103
124,
127
195
121,
125
110
DATA
COMMUNICATIONS
DEVICE (E.G., ROUTER
OR SWITCH)
111
114
113 PROCESSOR
152 AUTHENTICATION MANAGER PROCESS
121
122
153
AUTH. REQ.
DETECTOR
154
AUTH. RESP.
CREATOR
155
AUTH. RESP.
INSERTER
123,
126
121
158 INSERTION
MANAGER
PROCESS
112
MEMORY
151
AUTHENTICATION
MANAGER
APPLICATION
186
CACHED
REQS. FOR DATA
187
CONNECTION
STATE DATA
186
CACHED
REQS. FOR DATA
187
CONNECTION
STATE DATA
114
105
122,
124,
127
121,
123,
126
195
160
AUTH. INFO.
(E.G., USERNAME/
PASSWORD)
130
SERVER DEVICE
135
SERVER
APPLICATION
(E.G. WEB SERVER)
188
SERVER
CONNECTION
STATE
140
DATA

FIG. 3

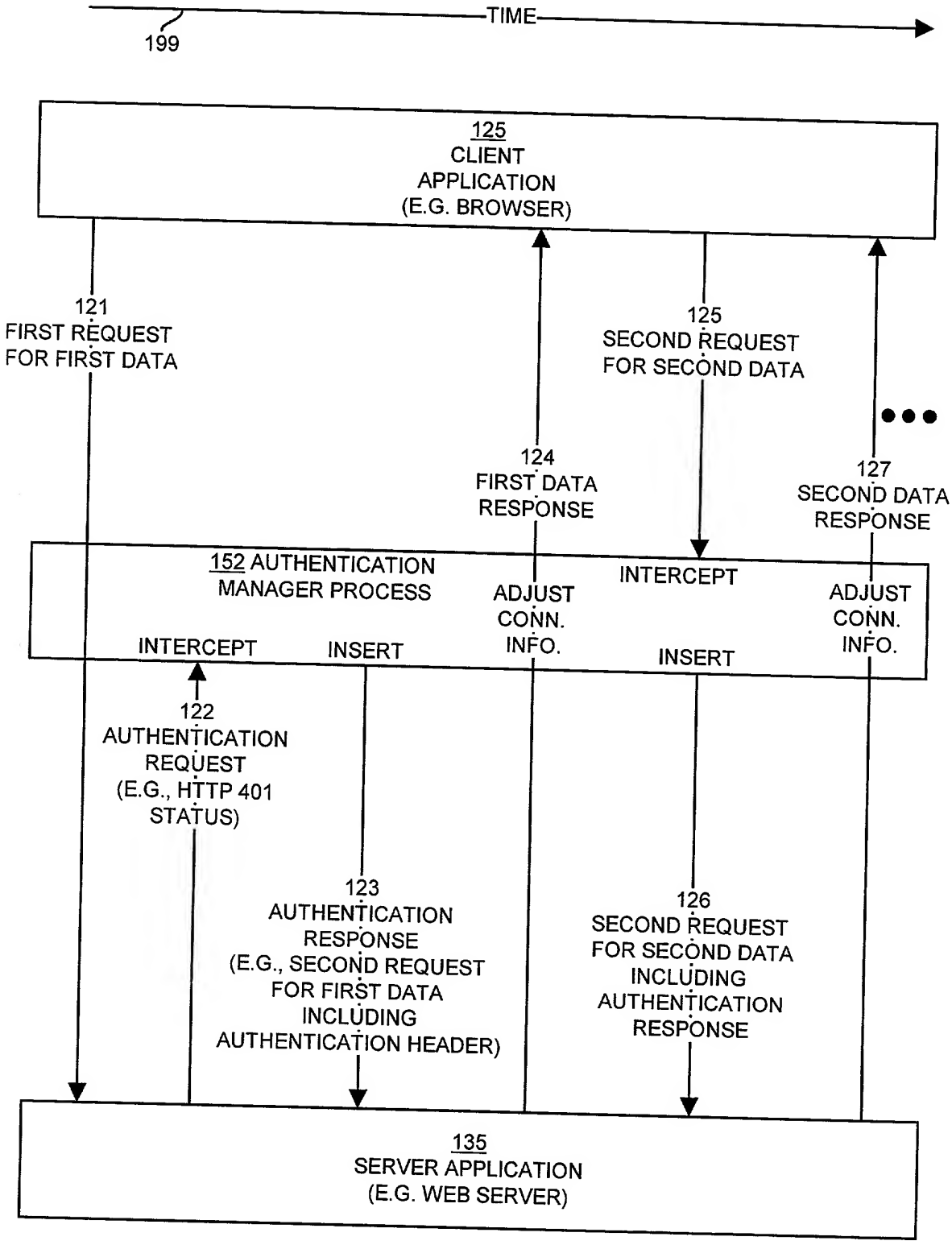
TIME
199
125
CLIENT
APPLICATION
(E.G. BROWSER)
121
FIRST REQUEST
FOR FIRST DATA
124
FIRST DATA
RESPONSE
125
SECOND REQUEST
FOR SECOND DATA
127
SECOND DATA
RESPONSE
152 AUTHENTICATION
MANAGER PROCESS
INTERCEPT
ADJUST
CONN.
INFO.
INTERCEPT
ADJUST
CONN.
INFO.
INTERCEPT
INSERT
INSERT
122
AUTHENTICATION
REQUEST
(E.G., HTTP 401
STATUS)
123
AUTHENTICATION
RESPONSE
(E.G., SECOND REQUEST
FOR FIRST DATA
INCLUDING
AUTHENTICATION HEADER)
126
SECOND REQUEST
FOR SECOND DATA
INCLUDING
AUTHENTICATION
RESPONSE
135
SERVER APPLICATION
(E.G. WEB SERVER)

FIG. 4

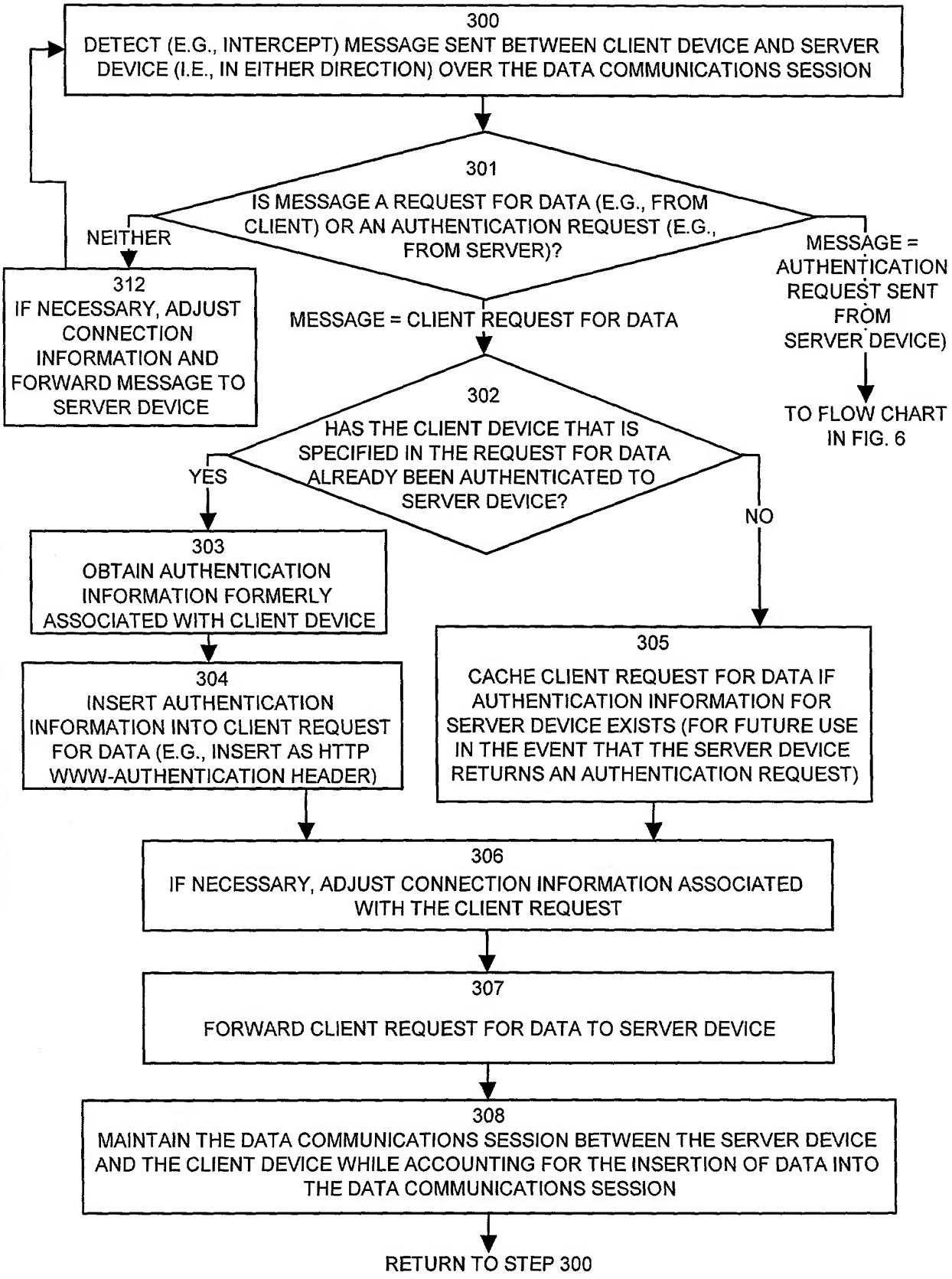
300
DETECT (E.G., INTERCEPT) MESSAGE SENT BETWEEN CLIENT DEVICE AND SERVER DEVICE (I.E., IN EITHER DIRECTION) OVER THE DATA COMMUNICATIONS SESSION
301
IS MESSAGE A REQUEST FOR DATA (E.G., FROM CLIENT) OR AN AUTHENTICATION REQUEST (E.G., FROM SERVER)?
NEITHER
MESSAGE = AUTHENTICATION REQUEST SENT FROM SERVER DEVICE)
MESSAGE = CLIENT REQUEST FOR DATA
312
IF NECESSARY, ADJUST CONNECTION INFORMATION AND FORWARD MESSAGE TO SERVER DEVICE
TO FLOW CHART IN FIG. 6
302
HAS THE CLIENT DEVICE THAT IS SPECIFIED IN THE REQUEST FOR DATA ALREADY BEEN AUTHENTICATED TO SERVER DEVICE?
YES
NO
303
OBTAIN AUTHENTICATION INFORMATION FORMERLY ASSOCIATED WITH CLIENT DEVICE
304
INSERT AUTHENTICATION INFORMATION INTO CLIENT REQUEST FOR DATA (E.G., INSERT AS HTTP WWW-AUTHENTICATION HEADER)
305
CACHE CLIENT REQUEST FOR DATA IF AUTHENTICATION INFORMATION FOR SERVER DEVICE EXISTS (FOR FUTURE USE IN THE EVENT THAT THE SERVER DEVICE RETURNS AN AUTHENTICATION REQUEST)
306
IF NECESSARY, ADJUST CONNECTION INFORMATION ASSOCIATED WITH THE CLIENT REQUEST
307
FORWARD CLIENT REQUEST FOR DATA TO SERVER DEVICE
308
MAINTAIN THE DATA COMMUNICATIONS SESSION BETWEEN THE SERVER DEVICE AND THE CLIENT DEVICE WHILE ACCOUNTING FOR THE INSERTION OF DATA INTO THE DATA COMMUNICATIONS SESSION
RETURN TO STEP 300

FIG. 5

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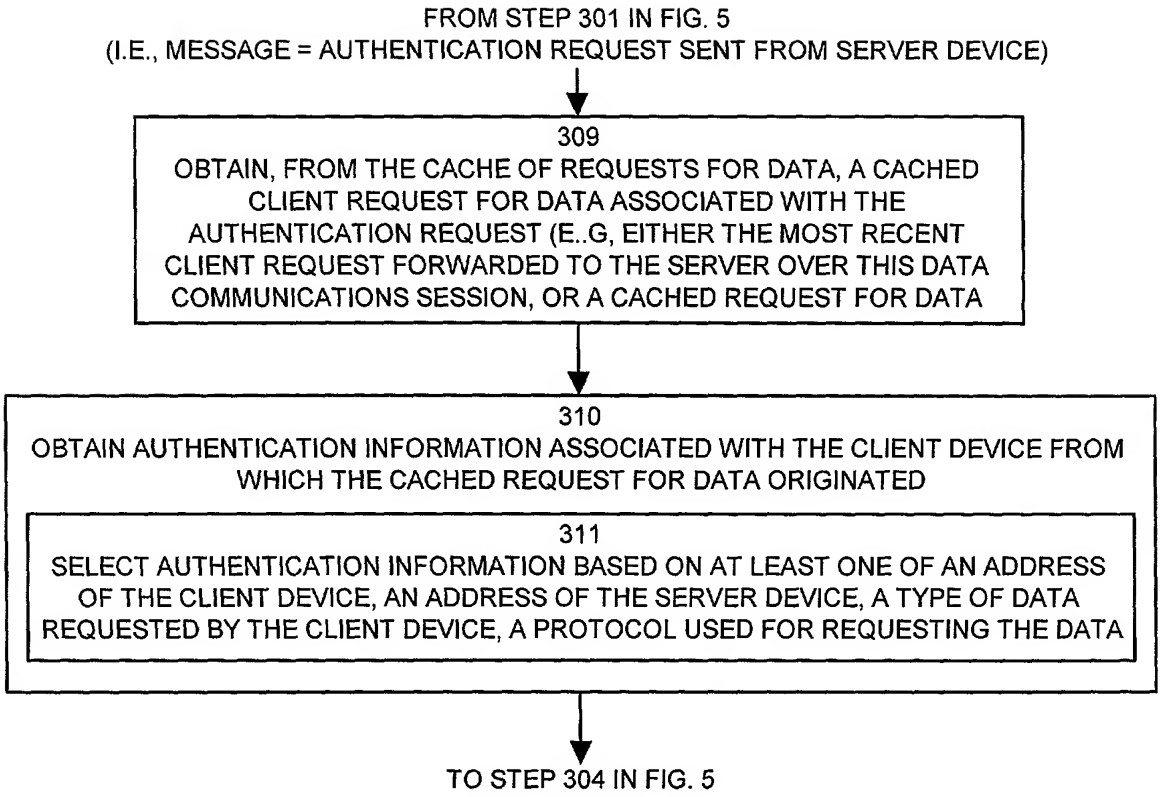

FIG. 6